

## ***Draft for Discussion***

October 11, 2002

### **A White Paper on Creating Load Zones**

*[S.Walton Note: Preston Michie prepared the first draft of this paper. Comments from Steve Walton and Kieran Connolly have been included in the form of a dialogue. The purpose of the paper is to stimulate discussion among members of the Market Design Working Group. (20Oct02)]*

#### Discussion

Both the SMD and RTO West proposal anticipated the creation of “load zones” to facilitate transactions within a large system with as many as 3,000 nodes. The idea of a load zone is the same as that for a hub except that a load zone would be comprised only of withdrawal points at a load.

The zone would be defined as the mathematically aggregate LMPs for a collection of nodes identified as “within the load zone” into a single virtual point for purposes of settlement. The resulting load zone is not used for physical delivery, which must be scheduled between nodes. However, for purposes of settlement, all injections (if any) and withdrawals from nodes within the load zone would have the same nodal price. In other words, load zones are not used for scheduling.

*[K.Connolly Note: Can this hold for demand response in ancillary service, redispatch and imbalance markets? It seems that there will be an over/under collection issue.]*

*[S.Walton Note: The creation of a load zone does not eliminate the individual nodal prices, rather it simplifies scheduling and settlement. For scheduling, the specification of load estimates for each bus would be very difficult. Bus by bus load variance is also larger than the variance of load for a collection of buses. The SC provides an estimate of the distribution factors and of the total load for its total load in a zone. Since the settlement is based on a load weighted average, which can be obtained from metering, settlement on a bus by bus basis will produce the same total revenue.]*

Transactions between a load zone and some other external node would be settled based on the difference between the LMP price at the external node and the zonal LMP. Transactions within a load zone (if any) would see no congestion charges.

*[S.Walton Note: Since the load zone is defined only as withdrawal points there are no transactions between them by definition.]*

Load zones may simplify settlement. Forming a load zone may reduce GTA issues. If all GTA customers in a particular region could be defined to be within the same load zone, transactions with GTA customers would be simpler. For example, a load zone could be defined as “all delivery points to all GTA customers in Idaho.” If the Federal system

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were defined as a hub (which admittedly is not likely), transactions between BPA and the Idaho GTAs would simply look like transactions between a single hub and a single zone for settlement purposes, thereby greatly simplifying settlement.

RTO West should be the final arbitrator of whether a load zone is formed. There should be no restriction on the number of load zones RTO West can create. RTO West should create load zones when and where it believes doing so would facilitate transactions. Market participants should be allowed to petition RTO West to form a load zone.

*[K.Connelly Note: See comment on the same issue in the hub paper.]*

There is no natural “right” answer to the proper size of a load zone—or its location. Similarly, there is no natural limit as to how large a load zone should be. Reasonably limits seem to be largely a matter of physics, not geographical area. For example, while mathematically a large load zone would be feasible, if congestion frequently occurs within a load zone, prices at an excessively large load zone may be more volatile than were that load zone split into two load zones comprised of nodes of similar coherency (meaning prices at nodes within each load zone would not differ from one another much). Thus, the trade off on size seems to be volatility for simplicity. As Einstein once said, “Things should be as simple as possible, but no simpler.”

*[S.Walton Note: The practice in PJM has generally been to include only the buses of a single party in a load zone, so for instance they have a PECO Zone and a GPU Zone, etc. The matter of price volatility is less important for load zones than hubs, because they generally represent a settlement point for one party. However, a party with a very large dispersion of load, may want to have geographic zones to make the resulting zonal prices more meaningful. That would be facilitated by grouping buses with less frequent congestion between them and whose prices tend to move together.*

*In New York, the zones are more complex and are geographic in scope, much like the zone definitions considered in RTO West Stage 1 and the first part of Stage 2. I think the PJM approach comes closer to fitting RTO West’s need for definitional flexibility and simplification.]*

On its own initiative or in response to a request to consider forming a load zone, RTO West ought to create technical advisory committees as needed from time to time to assess the wisdom of forming or dissolving load zones. There should be no restrictions on the number of load zones that can exist. The number of load zones should be left up to RTO West, who should be guided by market realities.

*[S.Walton Note: In PJM, a zone is created with a simple request listing the buses to be included. The bus of one party is not included in a zone without its concurrence. All parties have the right to have settlement occur on a node by node basis.]*

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In calculating the load zone price, the contribution of each node should be weighted according to the amount of load at each node within the load zone.

### Issues

What happens if congestion occurs within a load zone? If the load zone is comprised only of load nodes, can this happen?

*[S.Walton Note: Yes, congestion can occur between two nodes in a load zone, depending upon which nodes are included. However, since the prices are load weighted, the resulting revenue settled is unchanged. ]*

If a transaction is scheduled between an injection and withdrawal pair wholly within a load zone, should it be treated as a normal transaction that will be assessed a congestion charge? In other words, is correct to think that a load zone only has effect when the transaction is between a node within the load zone and some external point?

*[S.Walton Note: If as suggested above, a load zone contains only withdrawal points by definition (i.e., PORs) then a transaction is from a node to a zone, or a hub to a zone or an external interface point to a zone, but not from a zone to anywhere. This however is a question that bears further investigation about consequences of a withdrawal only definition.]*